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THE
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### American Cotton Gins in India.

In July, 1851, the Eagle Cotton Gin Manufacturing Company, of Louisiana, sent to Calcutta one of their gin stands for making fine cotton, and intending it to enter into competition for the prize of 5000 rupees, offered in 1849 by the government of India, through the Agricultural and Horticultural Society of India. The Society awarded the American gin stand a prize of $1250 and a handsome gold medal.

### New Marine Governor.

Our engraving illustrates a new invention, which has for its object the regulation of the movements of marine steam engines, such as are used on board of our ocean steamers. When the vessel sails on an even keel, so that both paddle wheels dip simultaneously in the water, no difficulty is experienced in the working of the machinery. But when the ship rolls or rises and falls on the sea, one paddle is apt to be lifted out of water, and sometimes both are raised so that they cannot dip. Either of these circumstances is sufficient to cause a jerking and wrenching of the engine, by a sudden increase or diminution of speed consequent upon the irregularity of the resistance.

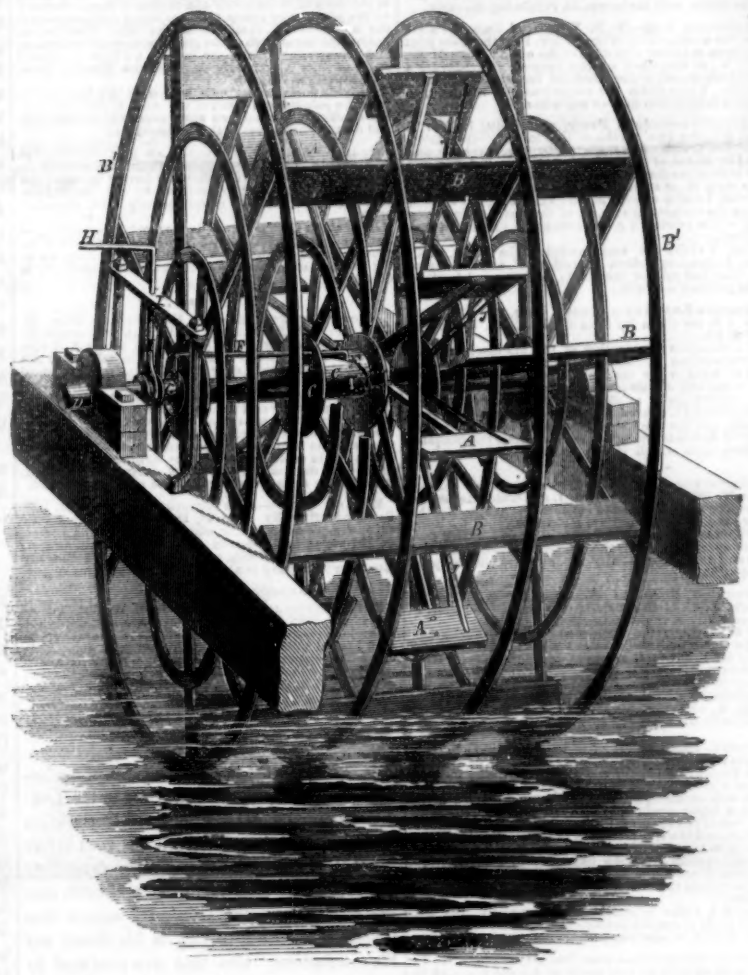
It is proposed to overcome these difficulties by the employment of a series of small paddles, A, placed within the ordinary wheel, B B', said small paddles being attached to a drum, C, revolving loosely upon the main shaft, D. A spiral slot, E, is cut in the periphery of drum C, and in this slot the end of a connecting rod, F, fits, so that when the drum, C, is partially turned forward or back, the rod, F, will receive a corresponding horizontal movement. Rod F connects with a sliding collar, G, on shaft D, and collar G is connected by means of rod H, with the throttle valve of the engine. Rod H passes through a swinging bar, I. By this series of connections the throttle valve is opened or closed according to the position of the small paddles, A.

The paddles, A, are held in place mid-way between the large paddles, by the springs, J, the inner ends of which are attached to the main shaft, D.

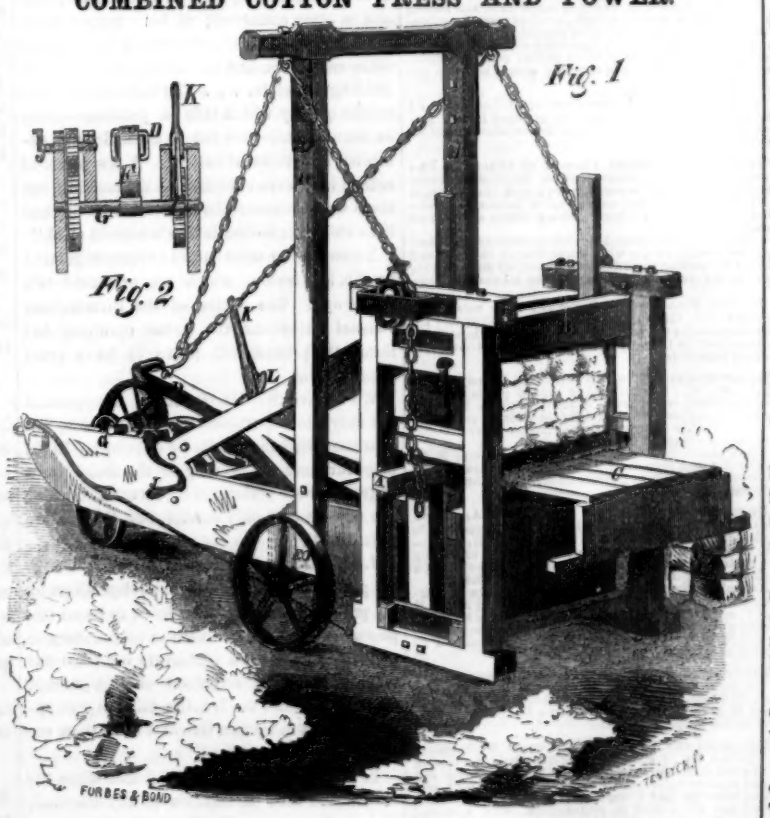
When the wheel dips properly, the water will press the small paddles, A, up against the faces of B, and the movement of A will turn C, operate rod F, and open the throttle valve, thus letting on a full supply of steam. When the wheel rises from the water, and no longer dips, the force which pressed back the paddles, A, will be removed, and the springs, J, will cause them to resume their position mid way between the large paddles; by this act the drum, C, will receive partial rotation in a contrary direction from that just mentioned, and rod H will be operated so as to close the throttle valve. In this manner the regulation of the engine is effected instantaneously, according to the power required. If the wheels dip, the full force of the steam is applied to the engine, but if the wheel rises out of the water, the steam is instantly shut off. The speed of the engine is thus regulated according to the work required of it at the moment.

This invention is applicable, at no great expense, to the paddle wheels of steamers now in use. The parts are simple and can be made as strong as circumstances require. The regulation of marine engines is an important subject, and any improvement relating thereto should be carefully examined by engineers. For further information address the inventor, Wm. B. Godfrey, Auburn, Mahaska Co., Iowa, or J. A. Knight & Co., 334 Broadway, N. Y. Patented May 27, 1856.

## NEW MARINE GOVERNOR.




## COMBINED COTTON PRESS AND POWER.




### Combination Cotton and Hay Press.

Our engraving shows an ingenious cotton and hay press, which is so arranged that the mechanism by which the pressure is obtained, may be separated, at pleasure, from the press, and used, for other purposes, such as moving buildings, raising burdens, extracting stumps, etc.

The press itself is of the usual simple construction, A, being the follower, and B the top board, C the hinged side board. The material to be pressed is placed between A and B. The ends of the follower, A, are raised, and the intervening substance compressed. D is a strong lever, one end of which is pivoted, and the other end is connected by strap, F, with a shaft, G, whose office is to wind up strap F, and pull down the end of lever D. (See fig. 2.) It is by the pulling down of lever D that the follower, A, is raised, for it will be observed that chains extend from the end of D to the top of strut frame H, and thence over friction wheels, I, to the ends of followers A. The lower ends of strut H rest on shaft E.

The necessary power for pulling down the end of D is obtained by a train of gear wheels connected with shaft G, in the usual manner, power being first applied at crank J, when the resistance is small and a quick motion admissible. But during the last stages of the operation, when an augmented pressure is wanted, power is applied to lever K, which, by means of its pawl, L, acts on a ratchet wheel on one of the gears. Suitable pawls hold the purchase as fast as obtained. After a bale has been compressed it may be removed, and the follower, A, lowered, by reversing the crank, with great rapidity.

All the parts of this press are strong and simple. It possesses the advantages of quickness of operation, unlimited power, cheapness, and portability The fact that the power mechanism can be detached from the press and applied to other purposes, as above indicated, will render the machine doubly valuable. This improvement is the invention of Mr. S. W. Ruggles. Patent applied for. Address Mr. G. D. Harris, assignee of the invention, Fitchburg, Mass., for further information.

### Decease of Distinguished Inventors and Mechanics.

We have recently recorded the decease of Paul Stillman and George Steers, of this city and N. J. Wyeth, of Cambridge, Mass., men distinguished for their inventive genius and mechanical skill, and now we have another name to add to the sad list. James Renton, of Newark, N. J., the inventor of a new furnace for manufacturing wrought-iron direct from the ore, named "Renton's process," died suddenly at Brighton, Pa., on the 26th ult. His furnace was illustrated and described on pages 169 and 172 Vol. IX, SCIENTIFIC AMERICAN.

### Action of Sugar on the Teeth.

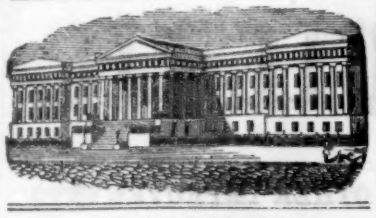
The Charleston, S. C. *Medical Journal* states that M. Larez, in the course of his investigations on the teeth, arrived at the following conclusions:

"1st. Refined sugar, from either cane or beets, is injurious to healthy teeth, either by immediate contact with these organs or by the gas developed, owing to its stoppage in the stomach.

2nd. If a tooth is macerated in a saturated solution of sugar, it is so much altered in the chemical composition that it becomes gelatinous, and its enamel opaque, spongy and easily broken.

3rd. This modification is due, not to free acid, but to a tendency of sugar to combine with the calcareous basis of the tooth."

The foregoing conclusions are correct, and candies and condiments should be avoided. They should be kept from children especially. It is well known that maple sugar renders the teeth tender and sensitive.



[Reported Officially for the Scientific American.]

## LIST OF PATENT CLAIMS

### Issued from the United States Patent Office

### FOR THE WEEK ENDING SEPTEMBER 30, 1856.

FIRE-ARM—Joseph Adams, of Cleveland, Ohio: I am aware that gun and pistol barrels of three or more bores have before been used, but having either a mass of useless metal or an unnecessary space in the central portion between the bores; therefore I distinctly disclaim such an arrangement.

But I claim the employment of a revolving barrel, formed from a single piece of metal, with three bores of equal diameters, or four bores in opposite pairs of unequal diameters, when so arranged that the bores are located as near together as practicable, to secure the proper strength of dividing metal, while the relative positions of said bores are such that their outermost tangents shall revolve in a common circle around the central point between them, and be equi-distant apart, the outer periphery of the barrel also so conforming to the bores, as to dispense with unnecessary metal, for the purpose of securing the utmost compactness, lightness, symmetry, and strength, with a given capacity, and at the same time of retaining perfect convenience in respect to revolving and discharging, substantially as specified.

I also claim the employment (instead of separate breech pins) of a single breech piece, provided with branches or pins fitting the several bores, and secured therein by a right and left nut, for the purpose specified.

I also claim the socket, B, in combination with the breech piece, C, and collar, E, substantially in the manner and for the purpose set forth.

I also claim the peculiar construction, arrangement, and combination of the hammer, main spring and trigger, as adapted to the rest of the gun, and operating both to hold the hammer cocked and down upon the nipple until set free by moving the trigger, substantially as set forth.

BRICK MACHINES—Henry Brad, of Greencastle, Ind.: I claim the self-adjusting frame, a, for the purpose of removing the brick from the molds on to the apron, b b, after they are pressed, operated by means of spring, i, and projections, O o, on the revolving journal, H, when the above parts are constructed, arranged, and operated as set forth.

GRIDIRONS—Wm. Bennett, of New York City: I do not claim either the gridiron or cover.

But I claim the pins or elevators attached to the bars or seats of the gridiron, as set forth, used in connection with the ventilating cover, constructed and arranged substantially as described.

LOCKS—G. W. Coppernoll, of Ohio, N. Y.: I claim, first, the swinging guards in front of the bolt chamber, actuated by the fixed portion of the key, in combination with the sliding guards, actuated by the secondary key, arranged and operating as and for the purposes specified.

Second, the eccentrics, I and J, arranged relative to each other, and the bolt, as set forth, and actuated by the secondary key after the removal of the guards, substantially as and for the purposes specified.

Third, the combination of the swinging guards, tumblers, and spring catches, operating substantially as specified.

SELF-HEATING SMOOTHING IRONS—William D. Cummings, of Washington, Ky.: I claim the trough, g, extending rearward from the bottom of the fire space in the described combination, with the ash receiver, h, open at the side next the said space, and provided with a registered top, i j k, for the purposes of cleanly separation and removal of the ashes, &c., as explained.

HERMETRICALLY SEALING BOTTLES—M. B. Espy, of Philadelphia, Pa.: I claim the employment of the two-part screw collar, C, for the purpose of drawing down and holding the cover over the mouth of a bottle, so that the said bottle shall be hermetically closed by the cork, d, or its equivalent, being compressed upon the upper edge of the lip of the same, as described, the said collar being constructed, applied, and operating substantially in the manner set forth and described.

STEAM BOILERS—David H. Fowler, of New Orleans, La.: I claim the arrangement of the central and exterior fires, with the open space, e e, and apertures, g g, substantially as and for the purposes set forth.

JOURNAL BOX ALLOYS—John Fidler, of New Albany, Ind.: I claim the composition of the ingredients named, in the specified mode and proportions.

WIND MILL—Marcus Frisbee, of Rensselaerville, N. Y.: I claim the combination of the spring on the sails with the adjustable or shifting straps operated by the lever, in the manner and for the purposes set forth.

MIXING WHEAT FLOUR WITH PAINTS—Isaac Gattman, of Philadelphia, Pa.: I do not claim exclusively the use of watery solutions for mixing paints.

But I claim the manufacture of paints by grinding crude colors in a composition of water, flour, or its equivalent, rosin, or its equivalent, fish oil, or any drying or undrying oil, in the proportions and manner substantially as set forth, in order that the paint thus manufactured may be produced at a cheap rate, and afterwards thinned with water to the required consistency.

SOFTENING LEATHER—John Greenleaf, of Lowell, Mass.: I claim the combination of the blade, I, with the cylinder, B and M, and apron carriage, A2 and D2, for softening and graining leather, when arranged and operated essentially in the manner and for the purposes set forth.

BRICK MACHINES—Joseph A. Hill, of Greencastle, Ind.: I claim the drum L, provided with the pinion, l, when constructed as shown, and arranged to operate relatively with the rack bar, K, and pinion, j, as described, for the purpose of reciprocating the carriage, J, in the manner and for the purpose set forth.

PHOTOGRAPHIC INSTRUMENT—Daniel J. Kellogg, of Rochester, N. Y.: I claim my method of converting the canvas itself into a basin by means of the metal ring, figs. 1 and 2, as described.

SEED PLANTERS—B. Kuhns, of Dayton, Ohio, and M. J. Haines, of Delaware City, Del.: We disclaim of itself the pocketed roller, and also the cells surrounding the discharge openings.

But we claim the combination of the cell and pocketed roller with the pocket clearer, actuated by the rotation of the roller, operating as and for the purposes set forth.

CULTIVATORS—Luther Robinson, of West Cambridge Mass.: I claim the arrangement consisting of the vertical cutters, G G J K K, horizontal cutter, H, mold boards, L L, and seed dropper, D, said parts being placed in the relation to each other shown, substantially as and for the purpose set forth.

LOCOMOTIVES FOR ROADS, &c.—John Robinson, of New Brighton, Pa.: I claim, first, combining the sliding bolt, q, by which the sector on the fore truck is locked, with the rotating shaft, R, which carries the gear which operates upon the sector to turn the fore truck, by means of a loose collar, t, and groove, u, or in a equivalent manner, whereby the bolt may be operated by a longitudinal movement of the said shaft, as fully described.

Second, fitting the sprocket wheel, P, to the shaft, K, which drives the fore wheels with a universal joint, to enable it to adapt itself to the direction of the driving chain when the said shaft, K, is not parallel with the engine shaft, and thus to prevent the chain slipping off the wheel, or being twisted or broken, substantially as described.

MANY-WICKED CANDLES—Benjamin D. Sanders, of Holliday's Cove, Va.: I claim a candle constructed as described, with three or more wicks, a, when said wicks are arranged angularly to each other or in the path of a circle struck from the center of the candle at equal distances apart or thereabouts, essentially as shown and for the purposes specified.

SAW GUMMERS—Samuel J. Lewis and Wm. Alston, of Bordentown, N. J.: We do not claim separately either of the respective devices constituting the saw gummer, as described.

But we claim the punch, A, constructed as described, in combination with the die, B, constructed and seated as described, the same being arranged in the carriage, C, so as to rotate and operate together, in the manner and for the purpose set forth and described.

PORTABLE FENCE—G. R. McIlroy, of Oakdale, Ind.: I claim the supporting the panels on the top of the bases or braces in the manner described, so as to allow of their being moved side-wise at the bottom sufficient to bring them into a perpendicular position on uneven ground, and securing the same by means of pins or wedges passing between the end batten of each panel immediately above the bottom rail or board through one of a number of holes in base or cross board at the bottom of the base, which holes are placed in a circle corresponding to that which the bottom of the panel describes, by moving it sidewise.

EXCAVATORS—S. G. L. Morrow, of Linn, Mo.: Disclaiming the several parts separately, I claim the arrangement as described of the cutter, elevator, and discharge chute, with the levers, l l, regulating the same.

ARTIFICIAL LEGS—O. D. Wilcox, of Easton, Pa.: I claim the employment of the pulley, P, at the knee joint as a common center of motion of the elastic cords, M M', and N N', as described for the purpose of producing a natural movement of the artificial limb, in the manner set forth. I also claim the employment of the sack, O, whether used in this limb or any other.

STEAM WAGON—John Percy, of Albany, N. Y.: I claim, first, the two trucks, C C, attached to the underside of the frame, A, connected by the perch, G, and turned by means of the rods, i i, which are fitted in the inner ends of the frames, b, of said trucks, and connected to the rack, H, or an equivalent device.

Second, I claim connecting the axles, d, of the wheels, D, with the connecting rods, e', of the steam cylinders by means of the gearing, e g, and cranks, h, substantially as described.

Third, I claim the arrangements of the trucks, C, C, frame, A, steam cylinders, E, boilers, F, and the device for turning and guiding the trucks, as shown and described for the purpose set forth.

FINISHING LEATHER——Joseph Pyle, of Wilmington, Del.: I do not claim the form of pin block, or the pin block at all.

But I claim the combination of the pin block, h, with its corresponding block, or same as upper block, composed of wood or any malleable metal, the feed rollers, m m, composed of like materials, or of wood covered by india rubber cloth, as shown, with the corresponding brush rollers, l l, geared and arranged, set and driven as set forth, for the purpose of softening leather or skins ready for finishing or any other materials substantially the same, upon which it will perform the same operation.

LUBRICATING THE SHEAVE PIN OF SHIP'S BLOCKS—John M. Riley, of Newark, N. J.: I claim the bands, E F, one or more, interposed between the axis, B, and the eye or band, D, of the pulley, C, the bands, E F, being perforated as shown, and the axis, b, provided with passages or apertures, f g, for the purpose of lubricating the bands and axle, substantially as described, for the purpose specified.

ATTACHING HUBS TO AXLES—John M. Riley, of Newark, N. J.: I do not claim separately the collar, F H, irrespective of their arrangement, as shown.

Nor do I claim springs interposed between the collar, G, and the inner end of the box, for they have been previously used, although arranged in a different way from that shown.

But I claim the collar, F H, placed upon the arm, B, in combination with the tube, E, nut, C, key, D, and elastic ring, K, when the above parts are constructed and arranged as shown, for the purpose specified.

BRIDGES—Isaiah Rogers, of Cincinnati, Ohio: I claim first, the formation substantially as described, of an arch whose voussoirs consist of one or more ranges of tubes in vertical planes, held in position by the described radial plates, with confining flanges; the tubes of each component are being gradually displayed and enlarged from the crown of the arch, each way, the enlargement in one direction, and the contraction in the other direction: being such as to preserve a circular section throughout, or gradually ovaling from the haunches by a vertical enlargement towards the ends, and a corresponding contraction toward the center of the arch, according to circumstances.

Second, I claim in combination therewith, the described mode of staying and bracing together, the several ranges of such tubular voussoirs.

TAILORS' MEASURES—Amos Stocker, of Rome, N. Y. I do not claim such an instrument as the one patented to B. J. Lewis, Nov. 19, 1833; nor do I claim the instrument as described by Samuel T. Taylor, rejected Nov. 18, 1840.

Nor do I claim the instrument referred to as patented to W. J. Wells, April 20, 1852; nor do I claim as new, the use of a tape measure, as seen in fig. 12. Nor do I claim the use of the hooks, as new.

But I claim the instrument as seen in fig. 1, with the arrangement of its eyelet-holes, eyelets, and letters, substantially as described and for the purpose set forth.

STEAM BOILER GRATES—Asbury M. Searles, of Cincinnati, Ohio: I claim, first, the described conical grate, k n o, formed by diverging radial bars, and having the described re-curved margin, or otherwise, or equivalent devices, for the purposes explained.

Second, I claim in the described connection with a conical grate, the radial series of pokers, n, or its equivalent, having the explained shearing action between the grate bars.

TRUNKS—Stephen F. Summers, of St. Louis, Mo.: I claim the inside metallic strips, D, arranged in combination with the casters, substantially in the manner and for the purpose set forth.

ORE-WASHER—Samuel Thomas, of Allentown, Pa.: I would state, I am aware that an inclined revolving vessel has been used in washing ores, and that a single shaft provided with shovels, and spiral flanges has been used. I do not claim either of these things separate or combined.

But I claim, in combination with a stationary inclined box, the double shafts with spiral flanges thereon, and turning in opposite directions, for lifting up and carrying forward the ores to the delivery, in the manner set forth.

PUTTING PILLOWS AND BOLSTERS INTO THEIR CASES—David B. Tiffany, of Xenia, Ohio: I claim the instrument having the peculiar construction, substantially as described, for the purpose of inserting the pillows and bolsters into their cases.

HYDRO-CARBON VAPOR LAMPS—Thos. Varney, of San Francisco, Cal.: I do not confine myself particularly to the convolute arrangement of the passage, h h, in the vaporizer, as there are other forms in which a passage or passages may be arranged to cause the air to take a circuitous route through the liquid.

But I claim the combination of the reservoir B, by means of a seal pipe C, with the stationary vaporizer C, containing a circuitous passage, under any arrangement, substantially as described.

DISCONNECTING RAILROAD CARS AND APPLYING BRAKES—Joab Buck, of Fitchburgh, Mass., (assignor to Joab Buck, H. S. Buck, J. W. Kimball, and D. H. Thompson): I do not claim the application of all the brakes by the engineer; nor do I claim the mere combination of a brake and coupling apparatus, as that is well-known.

But I claim the within described combination and arrangement of the shaft E, dogs Z, hooks Y, and levers H and V, operating in the manner substantially as set forth, for the purpose of uncoupling whichever car may be last in the train, simultaneously with the application of its brakes, as set forth.

REGULATING VALVES FOR STEAM ENGINES—Henry F. Shaw, of Woburn, Mass., (assignor to H. F. Shaw and Geo. F. Shaw, of same place): I claim the regulating-gates m, as connected with the valve D, and the governor, for the purpose set forth.

FURNACES FOR ZINC WHITE—Samuel Wetherill, of Bethlehem, Pa.: I claim making the whole or a portion of the bed of the furnace to vibrate for the purpose and in the manner, substantially as described; but this I only claim when the bed is perforated with numerous small holes, and when used in combination with a forced blast of atmospheric air, which passes to the charge of mixed ore and fuel, in numerous small forced jets, substantially as and for the purpose specified.

FURNACES—Richard Wells, of Baltimore, Md.: I claim in the construction of furnaces, the introduction of springs between the supporting plates and the fastenings of the tie-rods, substantially as and for the purposes set forth.

SEED PLANTERS—John F. Seaman, of Walcott, N. Y.: I claim the shares L, arranged substantially as shown, so that they may rotate intermittently, in order to free themselves of weeds, grass, and other incumbrances.

SAWING MARBLE—M. M. Manly, of South Dorset, Vt.: I claim a machine for sawing marble in angular or tapering forms by means of two horizontal saw frames or gates with adjustable guides, run in connection, one above the other, with the saws running and working in one plane, for the purposes set forth.

MACHINES FOR SEPARATING GREEN CORN FROM THE COB—Henry Walsh, of Philadelphia, Pa., (assignor to H. Walsh and M. N. Espy, of same place): I claim, in machines for removing green corn from the cob, first, the screw-shaft, B, and spring lever E, arranged and operating together as described, when the same are used in combination with the stationary block, G', and the self-adjusting spring-block G, and its cutter, F; the said blocks holding the cob between them, as it is rotated, and at the same time gradually and regularly moved forward by the progressive rotary action of the screw, and so that the said cutter, F, shall also at the same time operate against the lower ends of the grains of corn in succession, and remove them from the cob in a whole or perfect state, or without crushing or otherwise injuring them, substantially as set forth.

Second, I claim the combination of the ferrule, b', with the pointed screw-end of the shaft, B', the same being constructed, combined and operating, substantially and for the purpose set forth and described.

DASH-WHEEL, FOR WASHING AND BLEACHING.—Jas Wallace, Jr., of Glasgow, North Britain. Patented in England, June 26, 1855: I disclaim having invented the principle of bleaching or washing by the combination of mechanical agitation simultaneously with chemical action.

But I claim the use of the dash-wheel, substantially as described, in connection with the use of the chemical ingredients, and steam for the purpose of bleaching, washing or cleansing textile fabrics, and other materials, as described.

#### RE-ISSUES.

MACHINERY FOR MAKING HAT BODIES—Chas. St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, of New-York City, (assignees of Henry A. Wells, dec'd.) Patented April 25, 1846: What is claimed as the invention of the said Henry A. Wells, is, forming bats of fur fibres, by throwing the fur in properly regulated quantities, substantially as described, against a section of the circumference of a perforated cone, or other form, as the same is rotated to present in succession every part of the circumference thereof to the current of impelled fur, to obtain the required thickness of bat, substantially as described, in combination with the method of holding the fibres on to the cone, or other form, during the operation, substantially as described, and for the purpose specified.

ROTARY PUMPS—John Broughton, of Chicago, Ill.: Patented originally June 10, 1856: I claim the rotary eccentric piston, working within an oscillating barrel, within any arrangement of inlet and outlet passages, substantially as set forth, and this I claim whether my invention be applied to a pump or a rotary steam engine.

#### ADDITIONAL IMPROVEMENT.

FIRE-PLACES AND FENDERS—John W. Trualow, of Lewisburg, Va.: I claim the construction of a fire-place wherein recesses, D D2, are formed in the jambs thereof, with hinged folding and expanding wings or flaps, A A, and F2 attached thereto, forming a fender, and a screen, with the springs, E E, together with the double sliding panels, F F, fig. 1, and G G, fig. 3, substantially as described.

## Opinions on the new Process of Manufacturing Iron.

M. Truran, author of "The Iron Manufacture of Great Britain," in a letter to the London *Mechanic's Magazine*, severely criticises Mr. Bessemer's paper, which he read before the British Scientific Association, describing his process for manufacturing malleable iron and steel from crude iron. He asserts that Bessemer is neither correct in his theory nor his conclusions; also that iron produced by this process neither possesses the qualities of wrought-iron nor steel.

He says:—"The mere removal of a portion of the impurities in the iron by fusion does not, of itself, convert cast into malleable iron; castings with a slight degree of malleability at low temperature, are common in England and in other countries; at high temperatures they lose this quality, are equally brittle with other cast-irons, and are utterly devoid of the welding principle. . . . The cast steel of excellent quality which it is to produce—cheap as finers' metal—has yet to be made and exhibited in articles of cutlery. A few pieces of refined iron were exhibited at the meeting, but these were no more like bars of iron or steel than chilled cast-iron is like tempered steel."

These are the same views as those expressed by Mr. Sanderson, which we presented two weeks ago. The editor of the Birmingham *Journal* entertains the same opinions, but thinks the process will prove to be a great improvement.

We believe that Mr. Bessemer exaggerated not only the importance of the process, but also misstated the results he obtained. In all blast furnaces the refining of the metal in a degree is now performed by streams of air; the new process only carries out this feature a little farther.

J. G. Martien does not advance the idea in his patent that he can make wrought-iron by his process; he only specifies it to be an improvement in refining the iron preparatory to puddling. We have previously informed our readers that the descriptions of this process, by Bessemer and the London daily papers, appeared to us more like Oriental fable than sober facts.

In our last number we stated that when the facts of the case in relation to Mr. Martien's claims were known by the public, Mr. Bessemer would find his plumes considerably ruffled. It affords us much gratification to pay a marked tribute of respect to the acknowledged honesty of the British Press, in relation to this case. Since we penned that article we have received several British papers, which defend Mr. Martien's claims. The London *Land and Building News* says:—

"Of Mr. Bessemer we know nothing individually. He stands prominently forward as an illustration and instrument of that injustice we have before alluded to, (unscrupulous Englishmen who appropriate foreign inventions) otherwise his name would not be found under our pen. The British Association has robbed the true inventor of his fair fame, and given credit to one to whom it is not due. If Mr. Martien be proved to be the first inventor, to him be all the honor, glory, and profit thereof. If not to him, to some other who may have preceded him, but *not* Mr. Bessemer, who has succeeded him."

The Birmingham *Journal*, whose editors understand the subject completely, asserts that the intelligent application of jets of steam to the manufacture of iron has yet to be made, but speaks favorably of air. It gives the credit to Reuben Plant, of Dudly, for using a pressure blast, blowing through molten iron in the puddling furnace, in 1849, but says: "The blowing of air in small jets through molten iron after it has left the blast furnace, is clearly the property of Mr. Martien."

David Mushet, the well-known scientific metallurgist and author, also defends Mr. Martien's claims in a searching article in the London *Mining Journal*.

## Feats with Wood on Railroads.

The N. Y. *Tribune* of the 2nd inst., describes the feats of some locomotives in running great distances with a small quantity of wood. It states that a locomotive on the Pacific Railroad (Mo.) lately hauled three passenger trains with 106 passengers, and one baggage car, 125 miles in 7 hours with one cord of oak wood. On the Ohio and Mississippi Railroad, a locomotive recently hauled the night express train 149 miles with one and a quarter cords of wood; the time not given. On the Norwich and Worcester Railroad a locomotive regularly hauls the accommodation train, back and forth—12 miles—making 32 stops, and standing one hour at Worcester, with only seven feet and a half of wood—or 8 cubic feet less than one cord. It also states that the average performance of locomotives is only from 25 to 50 miles per cord of wood.

We have noticed the performance of the locomotive, on the Pacific road in a former number, and allude to it again in connection with the other two, to say that the feat was not a great one, as the speed was not quite eighteen miles per hour. The consumption of fuel by locomotives, is in proportion to their speed, the load hauled, and the resistance overcome. A locomotive may be run 150 miles with one cord of wood, while another equally economical will require one cord for 20 miles. It is the work done, and not the distance run, which is the true test of the economy of fuel on railroads. The account of the running on the Pacific Railroad is somewhat satisfactory, because the speed and size of the train are given, but the statements respecting the other two locomotives—neither speed nor load being given—amounts to an absurdity so far as it relates to their economy.

## Reapers in California.

The *California Farmer* states that various harvesters are employed in that great State, and each has its admirers—McCormick's, Hussey's, Manny's—yet it says:—"We want stronger machines. The machines sent to this country were made for grain that yielded sixteen or twenty bushels per acre, with short, light straw; here we have tall heavy straw, and grain yielding twenty-five, forty, or even sixty bushels per acre, and often straw six or eight feet hight, and sometimes higher, consequently we need stronger machines."

We hope our manufacturers of reapers will take this as a sufficiently strong hint how to make their machines intended for California.

The children of the Church Education Schools in Ireland—90,000 in number—have been instructed by their teachers to destroy every weed they see. Good instruction.

### Electro-Plating with Aluminum.

As this metal is a most efficient protection against oxyd or rust, any improvement by which it can be economically applied to coat iron, or any of the oxydizable metals is invaluable. A patent has recently been secured in England for this purpose by F. S. Thomas and W. E. Tilley, and their specification has been published in *Newton's London Journal*.—As it is a very plain, important, and interesting document, we publish the following literal abstract of it :—

This invention consists in depositing aluminum, by electric currents, from a solution of alumina, prepared as hereinafter explained, with or without other metals, and in plating or coating metals with aluminum and alloys composed of aluminum and other metals :—

No. 1. *Solution of Alumina.*—In order to prepare about four gallons of a proper solution of alumina for the purpose of our invention, we place about 4 lbs. of the alum of commerce in an iron pot or crucible, and heat or roast the alum therein until it ceases to boil, and has been reduced to a dry powder by being deprived of its water of crystalization.—We then boil about two gallons of distilled water, into which we put the calcined alum, and boil the mixture well; we then add about 2 lbs. of cyanide of potassium, and boil again for about half an hour; then add two gallons of distilled water, with 2 lbs. more of cyanide of potassium, and boil again for a short time, and then filter the solution, which will then be ready to form a bath.

No. 2. *Solution of Alumina.*—Or, in place of the above, we dissolve about 4 lbs. of alum in water, and add thereto salts of tartar, until it ceases to precipitate. We then put the oxyd so produced into a filter and filter it, then wash the oxyd with water; then take the washed oxyd from the filter and place it in an iron vessel, and add thereto about two gallons of distilled water, and about 2 lbs. of cyanide of potassium. The solution is then to be boiled for about half an hour; two gallons more water is then to be added, and 2 lbs. more cyanide of potassium; the solution is then to be boiled again and filtered, when it will be ready to form the bath.

No. 3. *Solution of Alumina.*—Or, in place of the foregoing, we dissolve about 4 lbs. of alum in water, and add thereto ammonia until it ceases to precipitate; after which we follow the same mode and quantities as stated in No. 2, the only difference being that ammonia is used to precipitate the alumina in place of salts of tartar.

No. 4. *Solution of Alumina.*—Or, in place of the foregoing, we dissolve alum in water, and precipitate with carbonate of potassium, then filter the alumina, then take the alumina and roast it upon an iron plate until completely dry; we then place in an iron pot or crucible about 4 lbs. of cyanide of potassium, which we completely melt; we then add about 1 lb. of the dried alumina, and melt this with the cyanide; we then add (by degrees, to prevent a violent ebullition) about 1 lb. of carbonate of soda, and we fuse these three ingredients together about one minute at a red heat. We then place the mixed ingredients in about four gallons of water, then boil and filter, and the solution is ready. In a bath of the alumina, the articles to be plated are to be suspended by means of copper or brass, or other suitable rods, attached to the zinc or negative pole of a galvanic battery, and to the positive pole is to be attached a piece of platinum or a pole of aluminum. In the case of a platinum pole the metallic property of the bath is to be sustained by suspending therein a bag of the oxyd of alumina, and replacing such from time to time with fresh alumina, or by adding the solution of alumina from time to time. In working aluminum baths of various dimensions, we have used the battery of Bunsen of six cells, and also the battery of Smee of ten cells.

No. 5. *To plate with an alloy composed of Aluminum and Silver, or with Aluminum, Silver, and Copper.*—We use for this purpose a bath composed of alumina made according to the processes described in Nos. 1, 2, or 3, but we prefer No. 3, and having set the bath to work with a platinum pole, to ascertain that the aluminum will deposit, we insert, in lieu of the platinum pole, a pole of silver, usually lessening the battery power, and the deposit should become whiter and thicker. When we wish to incorporate copper we use a pole composed of silver and copper melted and rolled together in such proportions as we think proper.—We have found equal proportions of silver and copper deposit a very white metal, similar in appearance to standard silver; beyond that proportion of copper we have found the deposit of a reddish tint In the bath of alumina, No. 3, the oxyds of silver, or of silver and copper may be introduced, but we consider it preferable to work the silver, or the silver and copper, from the poles, as described, in the bath of alumina. The battery power in this bath should be moderate.

No. 6. *To plate with an alloy composed of Aluminum and Tin.*—We make a bath of alumina according to any of the foregoing methods—preferably No. 4—and instead of using a platinum pole we use a pole of tin. The baths of the alloy of tin will work with various battery powers, the deposit will be thicker for the presence of tin, and the presence of aluminum will be known by the deposit taking a good burnish, which tin alone will not sustain. We sustain the bath by adding alumina in solution from time to time, the tin being supplied from the pole. Or, in lieu of this mode, we prepare the alumina according to the mode specified in No. 4, until all the ingredients for the alumina are fused together. We then take 4 oz. of metallic tin, dissolve it with nitro-muriatic acid, precipitate with salts of tartar, dry the oxyd, then add it to, and fuse it with the fused alumina for about half a minute—pour the fused mass upon a slab, then put the whole into about four gallons of distilled water, boil and filter it, and the solution is ready. This bath may be worked with a platinum pole, in which case both alumina and the oxyd of tin are to be supplied from time to time, or it may be worked with a tin pole, in which case the alumina alone is to be supplied in solution. Or, in place of the above, we take alum, which, when dissolved, we precipitate with potass, soda, salts of tartar, or any suitable alkali. We then dry the alumina on an iron plate. We then take the dried alumina and fuse it with cyanide of potassium and carbonate of soda, and also fuse with oxyd of tin. This is then turned out upon a slab, dissolved in water, then boiled and filtered, and the solution is ready. This solution may be worked and sustained in the same modes as the former.

[Concluded next week.]

### Cameos Enclosed in Glass.

When bas relief figures and medals enclosed within a coating of pure white glass were first brought before the public, they excited great surprise. This invention was first introduced by the Bohemain glass makers about a century ago, but from the inquiries sometimes made of us about it, it appears that a majority of persons are not yet aware how such works of art are manufactured.

The figure (or figures) intended for incrustation is made of materials requiring a higher degree of heat for their fusion than the glass within which it is to be incrusted. A mixture of China clay and silicate of potash is found to possess this quality. The bas relief is made of this material in a plaster mold, and after being slightly baked is gradually cooled. A mass of transparent white glass is blown hollow, with one end open, and the clay cameo, heated to redness, is placed within it. The mass is pressed or welded to make the two substances adhere, and the remote end being closed, the glass-blower *draws out* the air from within (instead of forcing in air, as in the ordinary manufacture), thus causing the glass to collapse, and to form one continuous substance with the cameo. When the glass is cut and polished to any desired form, the effect produced is striking and beautiful, for the clay cameo or bust has the appearance of unburnished silver, isolated in the midst of the solid transparent glass. Small articles are incrusted in a more expeditious manner, especially upon glass goblets or similar hollow vessels. The hot cameo is placed upon the hot manufactured vessel, a small piece of semi-liquid glass is dropped upon it, and this both fixes the cameo in its place and forms a glassy layer to enclose it.

### The Volcanic Eruption at Hawai.

In the number for July 24th, of the *Commercial Advertiser*, published at Honolulu, we find a graphic account of the great volcanic eruption of Mauna Loa mountain, which broke out on the 11th August, 1855.

The seat of this eruption is an old traditional crater, 12,000 feet above the level of the sea, in a region rarely visited by man. Connected with this eruption there is one fact which ignores the theory of Prof. Winslow, namely, that the lava is an eruption of the matter of the interior of the earth, which is supposed to be a mass of molten fire. The fact is this: On the opposite side of the mountain there is an old open crater—Killawea—about 7,500 feet lower than the seat of the new eruption. Well, this old crater has remained without overflowing during the whole eruption. On this head the above-named paper remarks :—

"Does not this show that the mountain, instead of being one huge boiling cauldron of molten matter, is divided into vast chambers or ducts, into some of which the water from the sea finds access, causes steam, whose powerful agency forces out the molten lava, while to other chambers the water finds no access."

The lava has been issuing from this great crater since it first broke out. With its windings it is about 65 miles long, and varies from three to ten miles in width, and varies from 20 to 300 feet deep. It has already overflowed 200,000 acres, and is now within six miles of Hilo, on the sea-coast. What a terrible sight, to see a river of burning lava three miles wide and 20 feet deep slowly and resistlessly moving forward, eating up every green thing. Huge forests are soon devoured by the fiery monster, valleys filled up, and nothing left but a smoking scene of desolation. At present the flow of lava is not so great as it was in November last year, but it is still immense, and there is no signs of its ceasing.

### Japan Varnish.

According to Thunberg, the very best Japan varnish is prepared from *Rhus Vernifera*, which grows in great abundance in many parts of that country, and is likewise cultivated in many places on account of the great advantages derived from it. This varnish, which oozes out of the tree on being wounded, is procured from stems that are three years old, and is received in some proper vessel. At first it is of a lightish color, and of the consistence of cream, but grows thicker and black on being exposed to the air. It is so transparent, when laid pure and unmixed upon boxes or furniture, that every vein of the wood may be seen. For the most part a dark ground is spread underneath it, which causes it to reflect like a mirror, and for this purpose recourse is frequently had to the fine sludge, which is got in the trough under the grindstone, or to ground charcoal; occasionally a red substance is mixed with the varnish, and sometimes gold leaf, ground very fine. This varnish hardens very much, but will not endure any blows, cracking and flying almost like glass, though it can stand boiling water without any damage. With these the Japanese varnish the post of their doors, and most articles of furniture which are made of wood. It far exceeds the Chinese and Siamese varnish, and the best is collected about the town of Jesino. It is cleared from impurities by wringing it through very fine paper; then about a hundredth part of an oil called *toi*, which is expressed from the fruit of *Bignonia tomentosa*, is added to it, and being put into wooden vessels, either alone or mixed with native cinnabar, it is sold all over Japan. The expressed oil of the seeds serves for candles. The tree is said to be equally poisonous with the *rhus vernix*, or American poison tree, commonly called swamp sumach.

### American Book Craft.

"Forty years ago, three men, by hand-work, could scarcely manufacture 4,000 small sheets of paper a day, while now they can produce 60,000 in the same time. It has been calculated that if the paper produced yearly by six machines could be put together, the sheet would encircle the world.

Nowhere is paper so much used as in the United States. In France, with 35,000,000 of inhabitants, only 20,000 tuns are produced yearly, of which one-seventh is for exportation. In England, with 28,000,000 of inhabitants, 66,000 tuns are produced; while in this country the amount is nearly as great as in France and England together.

A large proportion of this consumption of paper is directed to the 2,000 newspapers which are incessantly springing up in all sections of this country—some to flourish, but more born but to die, and make room for the succession."

"The first book ever printed in the New World was in the city of Mexico. It was printed in the Spanish language, in the year 1544, and was entitled *Doctrina Christiana per eo los Indos*. The first publications made in English, in America, were the *Freeman's Oath*, an Almanac for 1639, nearly a hundred years after the work published in Mexico. In 1640 was published the first book, entitled the *Bay Psalm Book*. It was reprinted in England, where it passed through no less than eighteen editions; the last being issued in 1754. It was no less popular in Scotland, twenty-two editions of it having been published there. Altogether, it is estimated it reached to seventy editions abroad."

"The first printing press set up in America was 'worked' at Cambridge, Massachusetts, in 1839. The Rev. Jesse Glover procured this press by 'contributions of friends of learning and religion,' in Amsterdam and in England, but died on his passage to the New World."

"It is believed that the amount invested in the book business in Boston alone, at the present day, cannot be less than three millions of dollars. Now there are nearly one hundred booksellers, and over fifty distinct publishers in the American 'Athens.'

In New York there are four hundred and forty-four booksellers and one hundred and thirty-three publishers, and in Pennsylvania, four hundred and two of the first and seventy-two of the last. Most of the publishing, and the largest number of the booksellers, center in the three great cities of Boston, New York, and Philadelphia, which are the leading publishing cities of the country. New York has the most capital invested in the business."

[The above are extracts from that ably written and interesting book, "Salad for the Social," published by Dewitt & Davenport, this city.

### Inventors of Cut Nail Machines.

A correspondent of the *Boston Traveler* writing from Hanover, N. H., gives a short biography of a remarkable individual who died in that place on the 16th ult. This was Increase Kimball, who departed this life at the age of 80 years, and labored under an aberration of mind for the past fifty. This correspondent says, "In 1804 he invented the first machine for making cut nails, and took out a patent for it. For this he was offered a large sum, but he refused to sell. Improvements were made by others on this machine and patented, which threw him out of the whole benefit, and the disappointment, is thought to have been the proximate cause of his derangement."

This letter has been copied by one of the daily papers in this city, and the statement thereby has been circulated far and wide. We regret this, because it contains great errors. It conveys the idea that Increase Kimball invented a machine, and that some other persons, by making slight improvements on it deprived him of the benefits of his invention. This cannot be done: no inventor of a subsequent improvement can use parts of a machine, covered by a previous patent, without the patentee's consent, therefore Mr. Kimball was not deprived of the benefits of his invention upon any such grounds.

The fact is he was not the first inventor of a cut-nail machine. His machine was patented in 1805, and no less than twenty-seven patents for such machines had been issued before his. Josiah O. Pearson, of New York, secured the first patent for a cut-nail machine in 1794, and the well-known Jacob Perkins, then residing in Boston, obtained one in the succeeding year. Whatever was the cause of unhinging the mental faculties of Increase Kimball, the correspondent of the *Boston Traveler* is not correct in his premises.

# New Inventions.

### Sales of American Inventions in Europe.

We have reports recently of the sale of some American inventions in England, at almost fabulous prices. It appears to us that our inventors do not fully appreciate the wide field open to them for the introduction of their improvements in England, France, and other European countries. It has been a part of our business for several years past to procure patents in foreign countries. Inventors desiring advice upon this subject can correspond with us freely in regard to it.

### Sawing Laths and Clapboards.

The accompanying engravings illustrate an improvement for sawing laths and clapboards. Fig. 1 is a longitudinal vertical section. Fig. 2 is a plan view—the carriage or bed to which the stuff is attached being removed; *x x* of this figure shows the plane of section fig. 1. The nature of the invention consists in the peculiar means for feeding the stuff to the saw, reversing the motion, and obtaining a perfect automatic feed movement.

A represents the framing of the machine, constructed in any proper manner to support the working parts. B represents an arbor or shaft to which the saw, C, is attached, the arbor being placed transversely on the framing, A. D represents a shaft which is placed in the framing, A, parallel with the saw shaft. On this shaft there are placed two cams, E E, (fig. 2) at a suitable distance apart; and F is a friction roller, which is fitted between them, said roller being on the inner end of a lever, G, which is attached by a pivot, *a*, to an arm, *b*, on the framing. The outer end of the lever, G, is forked and is fitted over a clutch, H, on a shaft, I, which connects either of two pulleys, J J′, with the shaft, I, the pulleys being placed loosely on this shaft.

K is a belt which passes around the pulley, J, and also around a pulley, L. N is a cross belt, which passes around pulley, J′, and a pulley, O, on the shaft, M. To one end of the shaft, M, a pulley, P, is attached, having a belt, Q, passing around it, which belt also passes around a pulley, R, on one end of the saw shaft, B. On the shaft, I, there is a pinion, S, which gears into a toothed wheel, T, on a shaft, U, said shaft having a pulley V, upon it, around which pulley a cord, *c*, passes, said cord also passing around a pulley, *d*, and having both ends attached to a carriage, W, which works between suitable guides, *e*, on the framing. A. The ends of the cord, *c*, are attached to opposite ends of the carriage, as shown in figure 1.

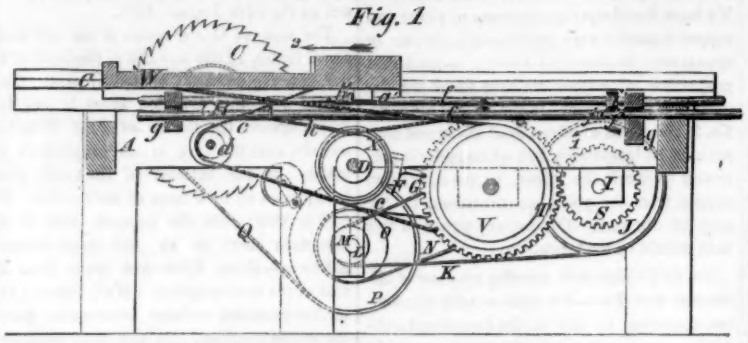
On the upper part of the framing, A, and directly underneath the carriage, W, there are placed longitudinally two rods, *f f′*, the ends of which are fitted in bearings, *g*, the rods being allowed to slide in said bearings. To one of the rods, *f′*, there is attached a cord, *h*, which passes around a pulley, X, on the shaft, D. The rod, *f*, has an ear or projection, *i*, attached to it, through which ear or projection the rod, *f′*, passes; this rod has two pins, *j j*, passing through it, one at each side of the ear or projection. Y is a spiral spring, which is attached to a crank pulley, *k*, at one end of the shaft, D. Z is a friction roller, which is made to bear against the belt, Q, by means of a spiral spring, A′, which is connected with a lever, B′, at one end of a shaft, C′, on which the friction reller, Z, is placed, said friction roller being on a crank on said shaft.

Operation.—The stuff to be sawed is secured upon the carriage, W, in any proper manner, and motion is given the saw arbor, B, and if the clutch, H, is in gear with the pulley, J, on the shaft, I, the pulley, V, on the shaft, U, will rotate in the direction indicated by the arrow, 1, and the carriage will be moved by the cord, *c*, in the direction indicated by the arrow, 2, and the stuff will be fed to the saw. When the carriage, W, arrives at a certain point, a projection, *a′*, underneath the carriage, W, will strike a pin, *b′*, on the rod, *f*, and said rod will cause the rod, *f′*, to be moved, and the cord, *h*, will turn the pulley, X; the cams, E E, will also be turned, and in turning will operate the lever, G, and throw the clutch, H, in gear with the pulley, J′, and by the cross belt, N, the shaft, I, will be rotated in an opposite direction, and a reverse movement will be given the carriage, W, which, when it reaches the extreme point of its backward movement, will be again moved forward in consequence of the projection, *a′*, striking against the ear or projection, *i*, which causes the lever, G, to throw the clutch, H, in gear with the pulley, J.

This very efficient automatic feed motion is obtained by very simple means. The improvement may be applied to sawing machines at a small cost, and it is not liable to get out of repair. The patent for it was granted on the 25th of March last. For further information address Jesse Gilman, Nashua, N. H.

## MACHINE FOR SAWING LATHS AND CLAPBOARDS.

*Fig. 1*



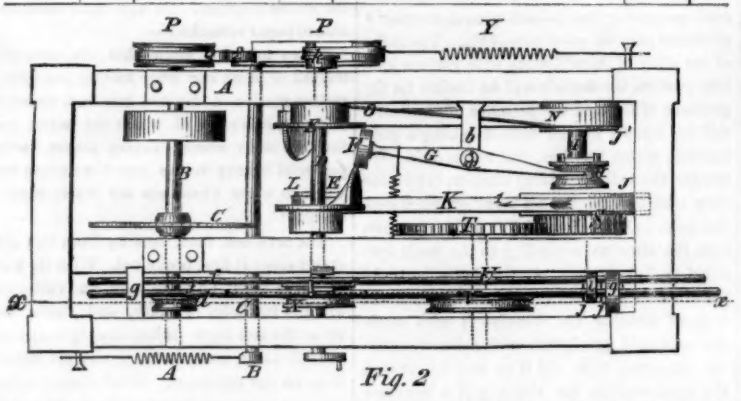
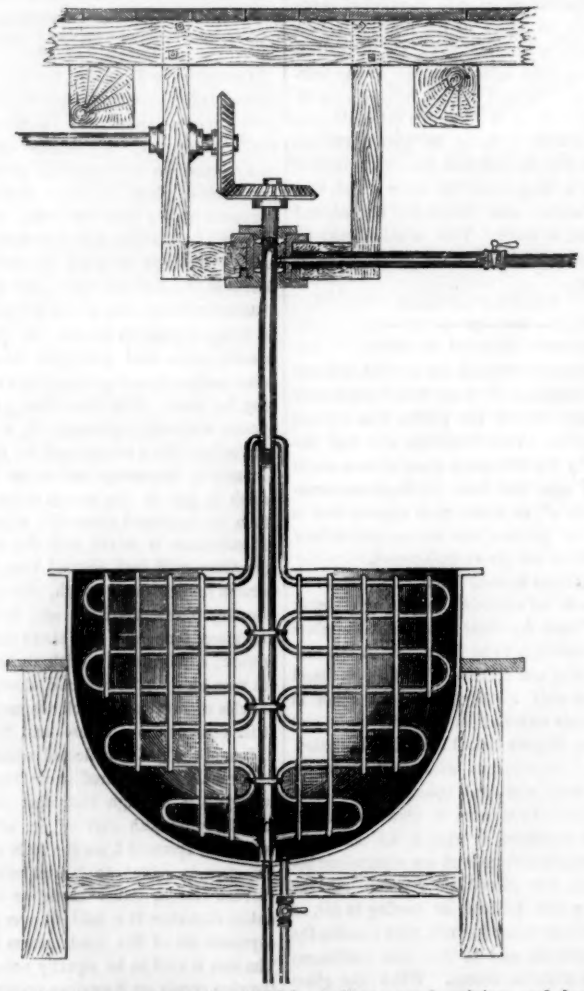


*Fig. 2*

## TUBULAR TWIRL FOR BOILING SOAP, RENDERING TALLOW, etc.



The above drawing represents the twirl, recently invented by Campbell Morfit, of Baltimore, Md., for the simultaneous mixing and heating of compounds. It consists of an upright shaft with tubular arms or branches, and derives motion by means of cog-gearing from a steam engine. A stuffing box, near the top of the shaft and connecting the steam boiler, serves as the medium for a constant current of steam through the branches, so that as the twirl is driven through the contents of a boiling vessel, mixing and heating take place co-incidently.

This arrangement not only economises time labor, and fuel, but produces a more perfect result than can be accomplished by any other means now in use. The twirl may be adapted to the ordinary forms of iron kettles or wooden tubs, and allows the use of steam of any temperature from "low" to "high," according to the pressure applied to the boiler. There is an outlet provided for the escape of excessive or condensed steam, and a vent, also, for spent lye, as shown in the engraving. Although specially designed for the manufacture of soap and rendering of tallow, the twirl will be found equally serviceable for all boiling operations; and more particularly those in which it is desirable to effect a combined mechanical and chemical action at one and the same moment.

### New Bullet Machine.

William H. Ward, of Auburn, N. Y., has invented a most ingenious and original machine for manufacturing bullets, from lead wire. The wire is coiled upon rests at the top of the machine, and suspended by means of arches, from which the lead is fed downward into the machine, where it is measured and cut off as required for each bullet, after which it is forced forward into dies, and formed into the desired shape by compression. The dies attached to the machine are of the most modern and improved style in the U. S. Army. It makes muskets, rifle, and pistol, elongated, hollow, and conical expansion bullets; also round or shell balls, all at the same time. At one corner it makes round balls, at another musket, at another rifle, at the other rifle and pistol elongated bullets—each corner being double, with two sets of dies and punches, which gives eight bullets to one revolution of the machine. The machine is capable of being worked up to twenty-five turns in a minute, which is equal to 200 bullets per minute, 12,000 per hour, or 120,000 per day.

The machine was driven, in Auburn, by a steam engine, and is complete within itself, requiring no attention while working, other than taking away the bullets and supplying the reels with lead. Another beautiful feature is, its perfection in doing work, using a sufficient quantity of lead and no more—it wastes nothing.

Mr. Ward was in this city last week with his machine, which has been forwarded to Washington, and he left us a set of bullets that were formed by it, which may be seen at this office.

### Gold Products Increasing.

The following is from the California *Mining Journal*. "The gold fields of Australia are yielding more largely than ever, at the rate of nearly £20,000,000 per annum—about $100,000,000. The produce of the first three months of 1856 is nearly double that of the corresponding three months of 1855, being close upon 700,000 ounces.

California, also, is now beginning to increase her contributions to the circulating medium. The greatly improved method of mining, and the rapid development of new diggings added to the increasing produce of the quartz mines, is beginning to be sensibly appreciated. Total shipments for 1854, $47,333,517. Total shipments for 1855, $44,060,374. Total shipments to Aug. 20th, 1856, $31,636,246.

### Unfortunate Steam Frigate.

By recent news from China we learn that the steam frigate *San Jacinto* broke down, on her passage from Whampoa to Simoda, and had to put back to the former place for repairs. Since this frigate was built she has cost, we believe, more for repairs of her machinery than its entire original cost, and she cannot be trusted to make a single voyage without fears of some break down.

# Scientific American.

NEW YORK, OCTOBER, 11, 1856.


### The New Theory of Heat.

Under the above caption our esteemed cotemporary, the London *Engineer*, of 12th September, quotes our article on page 405, Vol 11, entitled "Errors in Engineering," and makes a few comments thereon. It says :—

"We are of opinion that our trans-Atlantic cotemporary has not rightly understood the principles which have guided Mr. Siemens in the construction of his engine. So far from disparaging the dynamic theory of heat, which Mr. Siemens advocates as 'a mere term, out of which to raise a dust,' we look upon the same as one of the most important discoveries in physical science, and destined to lead inventive minds to great and practical results. The great difference between the old and new theory of heat is in this, that according to the old, heat and water are looked upon as the dynamic agents in producing motive force; whereas, according to the new theory, the water alone can be looked upon as the agent, whereas the heat is the material which is converted into power, and therefore gives up its very existence."

We did not disparage the dynamic theory of heat, but we stated that what was called "the dynamic theory" of heat, put forth as new by Mr. Siemens, was no discovery at all; that it was "a mere term out of which to raise a dust," and we are right, too, as we shall prove. Our cotemporary and Mr. Siemens entertain the idea that a new theory is a new discovery. This is a mistake; a new theory is simply a new way of explaining certain phenomena, but it is not a new discovery; it does not add a single new fact to the domain of science. Our cotemporary's explanation of the difference between the old and new theory of steam makes both *dynamic*, and the new one only a wrong explanation of the old theory; our cotemporary is our witness. The old theory is stated to be "heat and water are dynamical agents," that is, heat is an agent, and water an agent, and these two combined produce motive power in the form of steam in the engine. The new theory is "water is an agent and heat the *material* which is converted into power, and gives up its very existence."

Here it is asserted that heat is a material; but matter has the properties of indestructability, and yet we are told that this material "gives up its very existence." Matter has also the properties of inertia and gravity, but heat has not; it is, therefore, an imponderable agent.

Bacon says: "Heat is an expansive undulatory motion in the minute particles of a body." Descartes says: "Heat consists in certain motion or agitation of the parts of a body." Robert Boyle says: "Heat consists in that mechanical property of matter called motion." These philosophers held the dynamical theory of heat—for mechanical motion is dynamics—hence the new theory of Mr. Siemens is at least 200 years old.

The absurdity in his case appears to us to be that he simply calls an old theory *new*, and builds a steam engine upon this basis, to save fuel. Such conduct appears to be as sensible as would be that of a man who asserted that combustion was a new theory in illumination, and upon this idea molded a tallow candle to last longer, or give more light than the candle of any other person. If he effects the saving —50 per cent.—in fuel in his new steam engine, as asserted by the *Engineer*, it must be by some arrangement based upon old and well known principles, not the pretended new dynamic theory of heat.

Well, how does Mr. Siemens effect this great saving? Our cotemporary says: "In Siemens' engine the Respirator occupies the position of the heaters of the feed water of common high pressure engines, with this difference only, that it returns the *whole* waste heat to the engine, whereas the ordinary heater receives only 12 per cent." What has the new pretended dynamic theory to do with such claims. The Regenerators of Stirling and Ericsson were set up as effecting the very same objects, nothing more.

Our cotemporary states that there is one of Siemens' engines in Paris which consumes only about one half the fuel of the best expansive engines, and has no more back pressure on the pistons than common high pressure engines. If it consumes less fuel, we venture to assert it does less work. More extravagant claims were set up for the hot air engine, and as little back pressure, it was asserted, was exerted on its pistons. But it is impossible for steam to be exhausted into a close hot heater from the cylinder without exerting great back pressure on the pistons, it cannot be otherwise. Cold is as necessary as heat to produce reciprocating motion in a steam engine. Without a condenser of some kind there would be no steam engine. The atmosphere is the condenser of the high pressure engine, the vacuum condenser that of the low pressure engine. Many engines waste a great deal of heat, but that is owing to their bad construction, or not working the steam expansively, not for want of correct ideas respecting the old dynamic theory of heat.

### American Machines Saving Money to England.

The Birmingham (Eng.) *Journal* of Sept. 6th, contains a description of the government new manufactory of small arms at Enfield. It originated from the inability of obtaining a sufficient supply of arms during the late war from private makers.

In 1854 more than half a million of dollars were appropriated by the House of Commons to establish the new factory, and competent officers were sent to the United States to examine our government armories, purchase American superior labor-saving machines, and engage competent mechanics to superintend their operation. A great number of valuable machines were, therefore, purchased, and sent to England last year, and they are now in successful operation, under the general charge of Mr. Burton, first engineer—formerly master armorer at Harper's Ferry, Va.

About 430 men and boys are now employed at Enfield, but when the works are complete double this number will be employed, and 50,000 rifles per annum will be turned out.

All the machines for making the gun stocks were fabricated entire at the manufactory of the Ames Co., at Chicopee, Mass. They are the well-known invention of Thomas Blanchard, of Boston. This department at Enfield has twenty-seven machines, and is under the charge of Oramel Clark, of Massachusetts, another ingenious and intelligent countryman.

About 200 gun stocks are manufactured per diem, at a cost of about one shilling sterling each, for labor—about eleven-twelfths less than it cost the British government to make them previously by hand labor. The Birmingham *Journal* says:—

"In estimating the cost of making a gun stock at Enfield at one shilling, no allowance is made for the original cost of plant and tools, or their subsequent wear and tear; but at the same time there can be no doubt that the saving effected by machinery such as this, will, in a short time, repay its whole cost, if, indeed, it has not done so ere this."

This is what American machines are doing for England. Uncle John is not so blind to his interests as some have supposed. The factory at Enfield is a success; American machines and skill have made it so, and full credit is given to our country for this; Mr. Burton has got a first rate permanent engagement, and the American mechanics engaged there have received high praise and good pay.

It is stated that France, Austria, Portugal, Sweden, and Russia are about to follow in the wake of England, and have sent Commissioners to visit Enfield. The New World is now forging machines and ideas for the Old, and when we have fully brought the old nations up to the proper standard they may be allowed to annex themselves to the Confederacy.

### Resignation of Commissioner Mason.

We announced two weeks ago that Judge Mason had sent in his resignation to the President, but that it had not been accepted, and we trusted he might be induced to withdraw his petition. Since that time we learn that the friends of Mr. Mason, and the inventors generally, have so importuned him to remain at his post, that he will yield to their wishes for the present. His withdrawal from the Office may therefore be considered as indefinitely postponed; probably until the Secretary of the Interior shall attempt some new interference, when all of us who have dealings with the Office will realize the loss of an efficient and just Commissioner.

Inventors, improve your time, and get your applications filed while you have a tried and capable officer to look after your interests and see that justice is done you.

### Great Exhibition of the American Institute at the Crystal Palace, New York.

THIRD WEEK.

A marked change has taken place in the aspect of things at the Crystal Palace since our last report. The final day for the reception of goods for competition has passed, and the exhibition has fairly begun. It is a great exhibition. Never has there been witnessed so large and so splendid a display, so purely American in its character as that which is now inaugurated.

It is a magnificent sight to stand at some elevated position within the Palace, and gaze down upon the scene below. The broad floors of the edifice are filled with the noblest specimens of Industry, Science, and Art. The hum and clatter of a great array of novel moving machinery attracts and arrests the attention, in one direction, while, in another, the ear is entranced by sweet sounds of music, pouring forth from multitudes of instruments, of elegant forms and surpassing excellence. A constant throng of spectators circulating around and filling every nook and corner of unoccupied space, imparts a wonderful animation to the whole.

The general arrangement of the Exhibition is good. Everything seems to be in its right place, and bears a neat, cheerful, and attractive look. The arrangement of specimens and the allotment of space is under the charge of Wm. B. Leonard, Esq.; in him the Institute have a most valuable and efficient officer. Too much praise cannot be awarded him for the satisfactory manner in which he has placed the Exhibition before the public. Indeed, all the Managers of the Institute appear to have exerted themselves to render the Fair, this year, one of unwonted superiority. We rejoice to say that they have been highly successful.

#### Steam Fire Engines.

The only steam fire engine at present on exhibition is a large and splendid machine made by Silsby, Mynderse & Co., of the Island Works, Seneca Falls, N. Y. This engine was built for the city government of Chicago, Ill., but will not be delivered until the close of the Fair. The pumps, and the engine which drive them are of the rotary kind, made under Holly's patent. The boiler is of tubular internal construction. Weight of the whole, 9,100 lbs.; cost, $5,000. Patented in England and America 1855. We have in preparation a large and splendid engraving exhibiting the engine as it appears in the Fair, which we shall shortly publish, with further particulars. The engine is one of the most prominent and interesting objects in the Machine Arcade. Its powers are exhibited at frequent intervals during each day. At the sound of the steam whistle everybody rushes to its vicinity to witness the mighty outpouring of water which it occasions. Its capacities are so great that it is found difficult to obtain a full supply of water, and it cannot, therefore, be shown to the fullest advantage. It drinks up the supply of two hydrants with such rapidity as to collapse the hose

The same parties exhibit a large variety of rotary steam engines and pumps made under the same patent. They are chiefly remarkable for simplicity of construction, compactness, durability, and effectiveness. The pumps vary in size and price, from those costing $10, so small as almost to go in one's pocket, to larger ones costing $500, and capable of throwing 1200 gallons, 30 feet high per minute.—The engraving to which we have alluded will exhibit the interior construction.

#### Power Looms.

There are only four power looms on exhibition; these are for plain weaving, and were made at the Empire Works, Stockport, Columbia, N. Y.—Messrs Benjamin & Reynold's. They are made with all the latest improvements, and can be driven at the high velocity of 240 picks per minute—60 to the inch. The picker staffs have curved rockers at the foot, and a parallel motion. The shuttle is arrested at the end of each shot by a keeper spring, so set that its pressure is graduated, increasing towards the end of the stroke, and releasing the shuttle more easily as it leaves the box—a good arrangement. Connected with the stop-motion there is a compensating device, which prevents *fell* being formed in the cloth. A self-acting friction brake stops the loom at once if the shuttle should be arrested in its race, and thus breakage of the warp is prevented. The driving pulley is boxed and coupled by a very ingenious arrangement of three sector arms set on knuckle joints at the center, and actuated by centrifugal action—they are forced out to couple by friction with the interior rim of the pulley. The web or cloth is kept stretched to its proper width by two small fixed roller *temples*—one at each selvedge. What an immense amount of labor is saved by the fixed temples alone; they require no attention from the weaver; whereas the old temples had to be shifted by hand every two minutes. One girl can attend four looms (if the weft is good) as easily as she can two with the old temples attached. The price of such looms is $70 each.

#### Printing Presses.

A Poly-chromatic, or press for simultaneous printing with several different- colored inks, is exhibited by Messrs. A. M. & G. H. Babcock, of Westerly, R. I. The machine shown consists of a central block having four level surfaces or beds, each of which receives a sheet of paper for printing. The block revolves, bringing each of its surfaces opposite to a platten. to which a portion of the types or engraving are secured. There are as many plattens as beds. As the sheets come in front of the plattens the latter advance and leave an impression of their types upon the paper. Each platten is inked by a different set of rollers, and thus a variety of colors are stamped upon each sheet of paper. Colored engravings, having almost the richness and elegance of oil paintings can be readily produced by machines of this kind. They may be made to print as many colors as are desired. Price $800 and up, according to size. The operations of this press are regarded with much interest by spectators at the Fair.

#### Windmills.

Mr. A. P. Brown, of Brattleboro', Vt., exhibits one of his self-regulating windmills, which appears to be of a very substantial and serviceable character. This invention was illustrated and described on page 361, Vol X, SCIENTIFIC AMERICAN. Fowlers & Wells, agents, Broadway, N. Y. Patented July, 1855.

Dr. F. G. Johnson, of Brooklyn, N. Y., is on hand, as usual, and exhibits a fine specimen of his self-regulating windmill. For engraving and description see SCIENTIFIC AMERICAN, Vol. XI, page 236. Patented Jan. 1856.

Messrs. Chambers & Hargraves exhibit a new windmill, patented Aug. 1856. One feature of novelty is an upright tail-board, which controls the angle of the wings. When the wind exceeds a certain force, the tail-board gives before the pressure, and causes the wings to move and present their edges to the current.

#### Thrashing Machine.

One of Holmes' Patent Thrashers is exhibited by Bonnell & Co., 211 Center street, New York. It is of small size, to be used by hand or power, as desired. It consists of a a few wooden, bars pivoted at one end, and caused to fall upon a platform. The bars are lifted by cams arranged on a rotating shaft. The straw is carried along under the bars by an endless apron. It is alleged that this machine thrashes out the grain, but does not injure the straw, like the common machine. It is claimed that two men, with one machine will do the work of six men with common flails.

#### Water Heater for Locomotives.

Magoon & Co., of St. Johnsbury, Vt., exhibit one of their patent smoke stacks for locomotives, by which the heat of the exhaust steam, and all the escape caloric is made to heat the water in the tender, and an important economy in fuel is thus obtained. We have

seen a number of recommendations of the invention, from practical railroad engineers, who are using it. They speak of it in the highest terms, and say that it heats the water in the tender to 110°, and higher, with a saving of 25 per cent. in fuel. It adds but little to the weight of the locomotive, and the expense of construction is quite small.

**Gear Cutter.**

G. W. Bigelow, of New Haven, Conn., exhibits one of his machines for cutting gear wheels. All machinists should give it a careful examination. The blank wheel is placed on a spindle, the parts adjusted, and the machine started. It then goes on and performs the whole work without being touched by the attendant. In all other machines we believe it is necessary for the attendant to stop the machine for each tooth that is cut, and adjust it by hand for a new one. Mr. Bigelow's invention is wholly self-acting, works with mathematical accuracy, &c. Price $400, and up, according to size. Patented 1855.

**Works of Art.**

The Palace is adorned with many of the noble pieces of statuary which beautified the World's Exhibition of 1853. But the present exhibition is enriched by a novelty, now for the first time shown, which is worth more than the price of admission to see. We allude to the "Descent of Christ from the Cross," by Carew, a celebrated artist of London. It is executed in alto-relievo, and its proportions are quite imposing. Nicodemus is supporting the body as it is being taken down from the cross, and near him are figures of persons sent by Pontius Pilate to superintend its delivery to Joseph of Arimathea. Joseph is represented holding the feet of the Savior. Near him, with head reclining upon the cross is John the Evangelist, and Mary the mother of Jesus. The two other Marys—Mary Magdalene and Mary the Mother of James,—sorrowful and weeping, complete the group. The drapery, postures, effect and execution are magnificent.

The circumstances under which this remarkable work is now presented to the public, are peculiar. The composition was originally executed, by Carew, under a contract with the late Bishop Murray, of Ireland, who ordered it for a cathedral, in Dublin. The price agreed upon was $70,000. But the decease of the Bishop, and the inability of his successor to pay the money, left the work upon the artist's hands. It was then exhibited at the great World's Exhibition, in London, 1851, where it rivalled the best of the multitudinous collection there shown.

Subsequently it was taken down and forwarded for display at the great Exhibition here, in 1853, but when the boxes arrived, many of the pieces were found to be sadly broken, and the directors refused to receive it. So sadly was it marred that no artist could be found here who could restore it, although many essayed. At length Mr. Charles Innis, of this city, an American sculptor of considerable note, happened to come across the wreck, and immediately recognized it, to his unbounded surprise, as the work of his former master. Mr. Innis had been a pupil of Carew, and had, in fact, assisted in the construction of the work in London. He at once set about its restoration. Success has crowned its efforts, and the great sculpture now stands before us in all its original perfection. No copy has ever been made.

**Apple Parer and Slicer.**

We refer the reader to the advertisement of Smith's patent Parer, which appears in another column. It is on exhibition at the Palace and attracts a crowd by its rapid and curious movements.

**Tobacco Pulp Segars.**

A patent has been taken out in England by W. V. Wallace and B. L. Lowell, of London, for reducing those parts of tobacco leaves left —after the finest portions are stripped off for segars—into pulp, by cutting them up in a machine, then submitting them to the action of steam in a close vessel. After this the pulp is made into sheets, by passing it through rollers from the pulp engine, or else through fine hair sieves, in the same manner that paper is made. The sheets of tobacco thus made from pulp are formed into segars and cheroots. Our segar makers can take the hint.

**Recent American Patents.**

*Brick Press.*—By Joseph A. Hill, of Greencastle, Ind.—Consists in a peculiar means of pressing the clay into the molds. Also in a new manner of feeding the molds underneath the pug mill, and discharging them therefrom, and in a peculiar shut-off board, whereby the descent of the clay into the molds is prevented until the clay is properly tempered and ground. Drawings would be required to explain the construction.

*Benzole Light.*—By Thomas Varney, San Francisco, Cal.—Refers to the burning of benzole for illuminating purposes, and consists in a vaporizing apparatus of a novel construction, by which all moving parts are dispensed with and simplicity attained. A very large evaporating surface is also obtained, by which the hydro-carbon and air become evenly mixed.

*Pulley Blocks.*—By J. M. Riley, of Newark, N. J.—Relates to a method of reducing the friction, by interposing metallic rings between the eye of the pulley wheel, and the bolt on which it turns. The rings revolve independent of each other, and greatly diminish the friction. The invention is applicable to all kinds of blocks.

*Seed Planter.*—By John F. Seaman, Walcott, Wayne Co., N. Y.—Consists of certain novel arrangements of shares, which open the furrow, the seed being dropped by the attendant, who touches a lever for that purpose, as the machine advances. The hills may be planted at any desired distance apart. The seed is covered by rotating shares, which are so operated and arranged as to clear themselves from weeds, etc. The seed is planted in a very uniform manner, is not scattered, &c.

*Seed Planting Prairie Plow.*—By Luther Robinson, of Cambridge, Massachusetts.—The sod is cut into strips by two knives, which project down from an oblong frame. Another knife, placed horizontally, cuts the strip underneath and loosens it from the ground. A corn planting contrivance now deposits seed upon the strip of sod, in its center. Two other knives now divide the sod again, and it is cut into three strips, the corn lying upon the central strip. Two mold boards invert the two side strips and throw them over upon the central strip, thus covering the seed between the grass surfaces of the sod. The grass soon decays and serves as manure for the seed. For breaking up the tough prairie soil this improvement appears to be well adapted.

*Farm Locomotive.*—By John Percy, Albany, N. Y.—This is a steam wagon or locomotive, for drawing plows, and doing all sorts of drudgery on farms. The improvement consists in certain novel means of turning the vehicle around, so that it may be guided and handled easily by one man. Also in a peculiar method of balancing the weight of the machine on the supporting wheels. It is intended to travel about on common roads and over uneven surfaces of ground like any other vehicle.

*Hubs and Axles.*—By John M. Riley, Newark, N. J.—This is an improvement in vehicles, relating to the attachment of the wheels to the axles. It consists of an anti-friction arrangement, composed of movable sleeves placed on the axle and interposed between it and the hub. There is a spring combined with these parts, which gives a certain degree of lateral elasticity to the hub, and thus prevents all injury from side jars and concussions. The improvement is simple, and not liable to get out of order.

*Tri-wick Candles.*—By B. D. Sanders, of Holliday's Cove, Va.—This improvement consists in forming a candle with three small wicks, placed at equal distances apart, forming a triangle, by which arrangement their flames form a hollow cone on the argand principle. A current of oxygen, is thus supplied to the center of the flame, perfect combustion insured, and a more brilliant light is obtained, as no smoke escapes, all the carbon being consumed. The flame of a common candle has a dark center, because the air which supports combustion, is only supplied at the outside, therefore there is considerable loss of combustible matter which passes off as smoke, or carbonic oxyd. This improvement in candles is designed to remedy this evil and effect the benefits described.

*New Lock Joint for Railroad Rails.*—By J. R. Hilliard, of Paterson, N. J.—One of the principal causes of damage to rails, is the unevenness with which their ends come together. It is usual to employ a metallic seat, in which the ends of the rails rest, but this only in part overcomes the difficulty.

The object of the improvement herewith illustrated is to form the ends of the rails in such a manner that they will lock together, and present a continuous rail for the car wheels to roll upon. With this view they are made with tongue and groove, as shown in our cut.

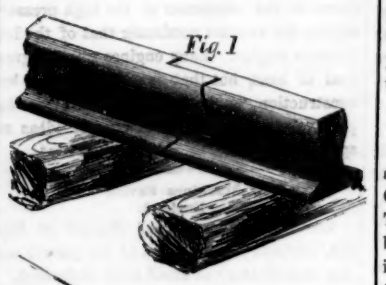


Fig. 1

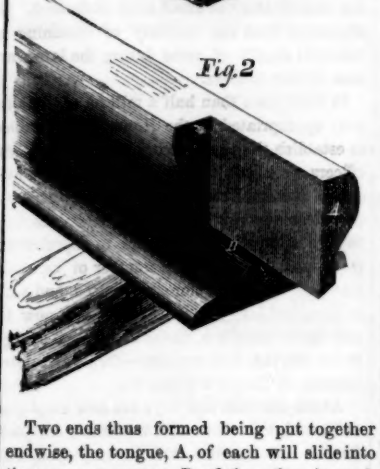


Fig. 2

Two ends thus formed being put together endwise, the tongue, A, of each will slide into the recess or groove, B, of the other, in such a manner that neither can be disconnected from the other by any downward pressure or by lateral pressure, and therefore when a number of rails are laid together in this way, they will form a perfectly continuous track for the support of which chairs, or other fastenings except spikes, are altogether unnecessary. Though this joint does not admit of the downward or lateral movement of either part without the other, it admits of a length of rail being taken up from or put in the track with as much facility as is afforded in any other track This is done by simply removing the spikes from both sides of the joint, and prying it up. This joint admits of the expansion and contraction of the rails lengthwise without its security being in any degree impaired, and without making a complete break in the track at every joint.

Among other advantages are the following: First, No movement of any rail in a downward or lateral direction can possibly take place. Second, evil disposed persons cannot take it apart or remove a rail unless previously shown the manner of its construction and of laying the rail. Third, The weight and lateral pressure of the engine and train confine both the ends of the rails which form the joint at the same time. Fourth, The disagreeable noise of clicking at the joints is entirely obviated. 5th, There is no battering down of the rails at the end, as each rail must remain in its own lock. Sixth, a great saving in labor for repairs will be effected, independently of the cost of broken chairs, or the wear and tear and breakage of engines and cars, caused by passing over sunken joints. Seventh, the working or settling of the sleepers under the joints will be effectually prevented, as there is no more tendency of the rail to settle or spread at the joint than at the center or other portions of the rail. Eighth, it renders the running of trains far more safe, by furnishing a permanent and well secured track which is equally as strong, substantial, and durable at the joints, as in other portions of the rail, and will not be improved by expansion and contraction. Ninth, when a rail is worn on one side, it can be changed end for end, as all the ends are formed alike.

Address the inventor, as above, for further information. Patented in the United States May 13, 1856. Also patented in England through the Scientific American Agency. Now on exhibition at the Crystal Palace.

*Steam Horse, or Farm Locomotive.*—By John Robingson, of New Brighton, Pa.—This is a steam wagon or locomotive of peculiar construction, so arranged that it will travel about on common roads, over fields and meadows, at the will of the farmer, dragging his plows harrows, seeding machines, etc. In short, doing all the hardest labor of the farm, besides sawing wood, driving the thrashers, straw cutters, churns, &c. The genius of the inventor of this improvement is very prolific. Several patents for other inventions have been granted to him within a few weeks past, and within a year we have prosecuted for him nine distinct applications.

**Colonization of Mexico.**

This Republic appears now to be under an able and patriotic government, from President Commonfort down to the humblest officer. The old tyrannic laws against all religions but that of the State church, have been abolished, and every man is allowed the freedom to worship according to his own faith. A law was also passed on the 10th of May last, to encourage colonists to settle in the most fertile and pleasant parts of that country, and agents have been appointed by the government in this city, to give immigrants all the necessary information and free passports. A territory has been established between Vera Cruz and Jalappa, where the soil is fertile, and the climate healthy, for four colonies. Each colony is to have 11,000 acres of land,—1000 for a village, and 10,000 for cultivation. Each colonist is to receive 100 acres, and a building lot. For the first three years, the colonist pays no duty, nor contributions of any kind; and he can introduce, free of duty, all kinds of grain and agricultural implements. From Vera Cruz, all colonists will also be transported, free of expense, to the colony, and each family will receive a milch cow, on arriving at their destination.

These are very liberal provisions for inviting colonists to settle in that country, and afford evidence of very enlightened views on the part of the present powers in authority. The great mineral wealth and natural resources of Mexico, under a wise, liberal and enterprising government, and a free, intelligent, and industrious population, would soon elevate that Republic to a high position. It has hitherto been the sad fate of Mexico to be torn by intestine factions, and the contests of contending chieftains for power and spoils. We hope these contests are gone forever, and that the people will labor in union and harmony to develope the exhaustless resources of this ancient center of inexhaustible wealth. The provisions made for colonization, are liberal and politic. A colony of industrious emigrants, always proves a benefit to any country, and those from the United States would introduce improvements of the very kind most required,—such as public schools, an improved agriculture, new inventions, &c.

Three crops of Indian corn are raised around Jalapa in one season; all kinds of grain and fruit are raised. Cattle are abundant and cheap; the forests are filled with valuable timber,—the copal, the india rubber, the rosewood and mahogany trees grow there, as well as the pine and the hickory. The cochineal insect which yields the crimson dye for fine woolen shawls, is found there. Silver, gold, copper, iron, mercury, lead, zinc, sulphur, and coal are abundant, but for want of skillful labor, are mostly lying dormant. We hope Mexico is destined to see better days than it has done heretofore.

**Boiler Explosions**

On the 1st. inst. a locomotive exploded at the Bolton depot on the Northern Central R. R. Md. The fireman was killed and the engine thrown 30 feet from the track.

The boiler of a portable engine exploded on the 2nd inst. at the Ohio State Fair, killing fourteen persons and wounding several others.

No less than 85,792,030 pounds of tea were exported from China in 1855.


Orlando Jennings, of Patterson, Nevada Co., California, is desirous of procuring machinery for drilling rocks in tunnels. He says several tunnels are in course of construction in the Golden State, and a rock-drilling machine will be of great service in the business.

I. N. V., of Cal.—We do not find the record of any patent on Smut Machine granted to H. B. Ingham in 1854. Lewis P. Ingraham obtained a patent in 1853 for a Winnower.

B. K., of Pa.—You must consult some lawyer about the Naturalization Law as it bears upon your case. We do not advise upon such subjects, it is not in our line. Cannot answer about the yarn.

A M., of Ill.—We do not think any of Wilmot's machines for sawing down trees have been manufactured.—See engraving of Ingersoll's machine, two weeks ago.

P. B., of Ala.—Pick the shellac you intend to use, selecting only the purest specimens, and dissolve it in alcohol. This will make a beautiful varnish, which soon dries. It can also be dissolved in turpentine and an alkali; but the alcohol varnish dries soonest, and is not so sticky.

J. M. A., of R. I.—Yours on the Rotoscope is very good; the theory is laid down in all mathematical works which treat of mechanics under the head of "rotary motions."

J. C. B., of La.—Marine glue is composed of india rubber and shellac dissolved in naphtha. About a pound of india rubber is used to the gallon of naphtha, and shellac added to make it of a creamy consistency. It requires about ten days for the complete maceration of these substances in the naphtha. It is stated to be insoluble in water. We have no drawings or descriptions of a corn-husking machine that we can send you, without a breach of faith. Send us your sketch, and we will examine it and give you our opinion.

J. S., of Mass.—It is scarcely possible for you or any person to explain the theory of the rotoscope to those who have not seen it operate, but the instrument explains itself. It exhibits various interesting movements produced by centrifugal force.

R. M. S., of N. J.—Scott Russel's work on steam and the steam engine is excellent on the nature of steam and its uses, but contains little on explosions. It is the most thorough work on steam published; sold by all our booksellers.

J. D., of N. Y.—If you read the remarks again relating to the fossil elephant, you will discover that they refer to a period when our part of the continent was colder than it is at present. The cold period is attributed to a greater elevation of our continent north. There is no evidence that the earth was ever nearer the sun than it is at present.

H. C., of Ohio.—The case to which you refer is familiar to us, and only adds another practical warning to the many already on record against procrastination on the inventor's part, in making application for a patent. If your friend had been prompt in getting his case into the Office, instead of allowing six month's time to elapse, he would have secured his invention, and thus avoided a contest in regard to priority of invention, which has evidently been a serious business for him, even though successful in the end. If you will send us your model we will prepare your case without delay. We will send your friend a circular of information.

C. C., of Mass.—We think you would do well with your invention in England. You must, however, judge for yourself as to the propriety of securing European patents. We should be very glad to do your business, and will aid you all we can in carrying out your views. One of our clients has just returned from England in the steamer Atlantic, after an absence of less than three months, having sold his patent for $50,000 cash, besides retaining an interes in the invention, out of which he has a prospect of realizing handsome addition. He took the risk of applying for an English patent, and has made his fortune by it. Models are not necessary in applying for English patents.

M. S, of Conn.—Porcelain is gilded by reducing gold to a state of oxyd, ground up with oil of turpentine and some substance having the property of a flux. It is then put upon the ware with a brush. The oxygen of the gold is burned off, and the metal, by the action of the flux, is cemented to the porcelain

E. H., of Vt.—Cast-iron is not pure iron. It contains carbon and other foreign substances. The difference between it and wrought-iron is that cast-iron not only contains these foreign substances, but is also fusible at a glowing heat, and can neither be forged nor welded, while wrought-iron is deprived of its carbon and other impurities, and is not fusible at a white heat, and may be forged and welded. By making this distinction you will be able to determine the question you have in dispute.

E. N. F., of S. C.—As many drops of rain will fall into a rain gauge at an angle of 45 deg. as will fall in vertically. Draw vertical and angular lines to intersect one another to represent the drops of rain, and you will perceive this must be so when the box or gauge is a perfect cube.

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**Money received at the SCIENTIFIC AMERICAN Office, on account of Patent Office business for the week ending Saturday, Oct. 4, 1856 :—**

G. H., of N. Y., $55; O. R. M., of N. Y., $10; J. L., of O., $30; W. W. D., of Cal., $50; D. & M., of Cal., $30; D. & S., of La., $25; M. L., of N. Y., $30; T. A. D., of Cal., $15. E. S., of Conn., $250; C. H., of N. Y., $15; A. G. C., of Vt., $35; J. H., of N. Y., $32; E. M., of N. Y., $55; H. G., of Canada, $500; J. J. C., of Mo., $25; D. & S., of La., $25; L. G., of La., $25; W. J. D., of N. Y., $30; C. & G. M. W., of N. Y., $30; W. H. McN., of L. I., $30; A. B. W., of Conn., $25; D. A. S., of Conn., $25; J. R., of Ala., $25; J. E. S., of N. Y., $30; C. & McD., of N. Y., $30; J. F. W., of N. Y., $30; T. & C., of Vt., $25; J. A. D., of N. Y., $25; J. S. S., of N. Y., $35; R. T., of N. Y., $25; P. B. of N. Y., $65.

**Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Oct. 4th :—**

J. A. D., of N. Y.; T. H., of N. Y.; J. S. S., of N. J.; R. T., of N. Y.; W. B., of N. Y.; C. H., of N. Y.; J. R., of Ala.; L. G., of La.; J. H., of N. Y.; D. & S., of La.; J. J. C., of Mo.; D. A. S., of Conn.; T. & C., of Vt.; P. B., of N. Y. (2 cases.)

## Important Items.

MODELS—Inventors, in constructing their models, should bear in mind that they must not exceed a foot in measurement in either direction. They will also remember that the law requires that all models shall be neatly and substantially made of durable material. If made of soft wood they should be painted or stained. We shall esteem it a great favor if inventors will always attach their names to such models as they send us. It will save us much trouble, and prevent the liability of their being mislaid.

PATENT LAWS AND GUIDE TO INVENTORS.—This pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office Price 12 1-2 cents per copy. A Circular, giving instructions to inventors in regard to the size and proper construction of their models with other useful information to an applicant for a patent, is furnished gratis a this office upon application by mail.

RECEIPTS—When money is paid at the office for subscription, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

FOREIGN SUBSCRIBERS—Our Canada and Nova Scotia patrons are solicited to compete with our citizents for the valuable prizes offered on the next volume. [It is important that all who reside out of the States should remember to send 25 cents additional to the published rates for each yearly subscriber—that amount we are obliged to pre-pay on postage.]

PATENT CLAIMS—Persons desiring the claim of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and date of patent when known, and enclosing $1 as fees for copying.

BINDING—We would suggest to those who desire to have their volumes bound, that they had better send their numbers to this office, and have them executed in a uniform style with their previous volumes. Price of binding 75 cents.

INFALLIBLE RULE—It is an established rule of this office to stop sending the paper when the time for which is was prepaid has expired, and the publishers will not deviate from that standing rule in any instance.

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

## Literary Notices.

BLACKWOOD'S MAGAZINE.—The number for September, of this veteran periodical, published by L. Scott & Co., No. 54 Gold-st., this city, articles on "The Scot Abroad," "The man of Diplomacy;" "Sketches of the way to Stockholm;" "The Athelings—Part 4;" "Sea-Side Studies;" "The Poetry of Christian Art," and a sharp review of "Macaulay's History of England." It is a good number.

THE KNICKERBOCKER.—"Old Knick" for this month, contains some capital articles and stories, with the usual rollicking, funny and witty Editors' Table. Some of the poetry is but indifferent; some exquisite. "Carle of Cambride" is a good story; "The Musings of a City Rail Road Conductor," are humorous. This Magazine is totally unlike any other in its literary characteristics. It is decidedly original in every respect. No wonder; it is a general favorite with literary connoisseurs.

## Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

# Science and Art.

### Rotation of Spheroids.

M. Boutigny, of Paris, has published an account of experiments on the rotation of a body in a spheroidal state. These are described as follows :—

"By means of a few drops of ether, he attaches a small cone of gum guaiacum to a highly heated silver capsule. As soon as the cone reddens on the summit, one or two grammes of water are dropped into the capsule, and a remarkable effect takes place. The water becomes agitated from right to left, left to right, backward and forward, indeed in every direction; but presently, as it assumes the spheroidal shape it sets itself spontaneously in motion around the cone from left to right, or from east to west. The motion, at first slow, goes on increasing, until its rapidity is such as scarcely to be followed by the eye. If the spheroid be stopped, by placing a small glass rod in its way, it pauses for a while, but only to resume its former movement. M. Boutigny considers this phenomenon to be well worthy the investigation of geometers, and strikingly analogous to the rotation of the earth."

The above is taken from one of our cotemporaries, and we have seen it in several. We cannot understand how a cone of the gum guaiacum could be prevented from burning in a highly heated platinum capsule, nor how the spheroid could rotate from west to east any more than from east to west. It all depends upon the point from which it starts.—The spheroid could not rotate around a cone on a horizontal spindle; it must, therefore, have rotated in a horizontal curve, not exactly analagous to the rotation of our earth.

### Beautiful Paraffine Candles.

Paraffine is a pure white solid substance, resembling wax, when melted in small quantities, but when cooled slowly it resembles spermaceti. It has no taste or smell, melts at 112° Fah.; burns without producing smoke, and is thus admirably adapted for making candles. It resists the action of all the strong acids, alkalies, and chlorine; these are peculiar properties, hence its name from *parum affinis*, denotes its want of affinity. It is made from peat tar, coal tar, and coal oil, but owing to the troublesome and expensive process of its manufacture, it is dear. Could it be manfactured cheap from coal tar and coal oil, it would be the best known substance for making candles. We hope improvements will yet be discovered for manufacturing it so cheap that it can be sold at a cost not exceeding that of tallow.

The candles heretofore made from it, have been chiefly confined in their sale and use to the city of London. They resemble spermaceti, having the same crystalized appearance, but a patent has lately been obtained by J. K. Field, and C. Humphrey, of England, for a very simple method of making them to have an appearance superior to wax candles. The paraffine is melted at 140°, then run into candle molds, heated up to 150°, then after standing in these for a few minutes, to allow all the bubbles of air to escape, the molds are plunged into cold water. This sudden cooling of the paraffine prevents it from forming into fine crystals, and the candles so made are nearly transparent, and draw easily from the molds.

The manufacture of paraffine, we believe, is unknown in our country, but we have no doubt of its being yet manufactured in great quantities, because we have the largest bituminous coal fields in the world, and these contain the means of supplying paraffine materials for thousands of years.

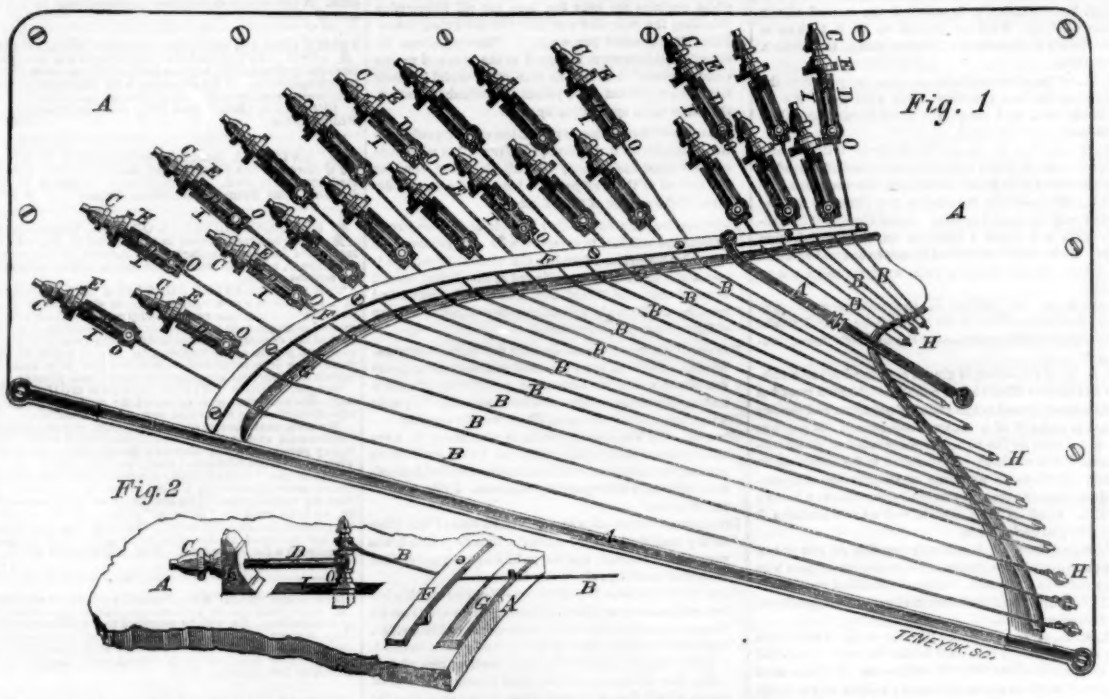
### Street Electric Chronometers.

The ingenious artist M. Breguet, of Paris, has devoted himself to the construction of chronometers in connection with the electric telegraph. He has placed a chronometer of great simplicity in a gas lamp. It consists of a dial armed with two needles moved by electricity, which mark the hours and minutes. The whole mechanism consists of three wheels, a pinion, an escapement, and a double ratchet, with a means of reversing the current; two wires pass from the lamp to a regulating clock situated in the apartment of M. Breguet. This inventor proposes to divide Paris into 12 electric districts, and place in each mayorality a regulator, which shall distribute time throughout the district, both to public lamps and private houses.

### Workmen's Model Houses.

No less than 2500 workmen's houses are about to be built in Paris, in groups of fifty, each group forming a square, with an open space in the center. Each house is to accommodate six families, at a rent of about $26 to each. Each group is to have a public bakehouse and bathing establishment.

## IMPROVEMENTS IN PIANOFORTES.




### Improvement in Musical Instruments.

The improvement herewith illustrated consists in the application of screws for tuning the strings of musical instruments instead of the ordinary tuning pins.

Fig. 1 is a plan view of the iron frame of a pianoforte with the tuning screws attached, exhibiting particularly their relative position and arrangament upon the frame. Fig. 2 is a section of the iron frame in perspective, showing the construction, arrangement and operation of a separate tuning screw. B are the strings, and H their hitchpins. G is the tuning block bridge, over which all the strings pass to the front ends of the tuning screws, D. The latter have on their upper sides small projections to which the strings are looped. The other ends of tuning screws, D, are provided with the screw threads, and pass loosely through holes in the fixed studs, E. The nuts, C, turn upon the tuning screws and abut against the studs, E.

The front end of the tuning screw, D, has a projection, O, on its under side, which rests upon the iron frame, A, and prevents the cylindrical part of it from being bent by the pressure of the strings. The lower extremity of this projection, O, slides loosely in a slot, I, which prevents the tuning screw from turning, while its nut, C, is tightened. F is a suspension bridge passing over all the strings at such a hight as to press them firmly down upon the tuning block bridge, G, thereby producing a more firm, round, and clear sound than can otherwise be obtained.

To tune an instrument with these tuning screws, it is only necessary to turn the nuts, C, with a proper wrench or key, and the screw, will be drawn backward and stretch its string to the proper pitch and harmony.

Pianofortes provided with this improvement can be tuned with as much accuracy and ease as a guitar; and when once tuned they will keep their perfect harmony a greater length of time than they can do by the ordinary contrivance.

Another advantage of this improvement is the facility it affords for decoration and ornament, at comparatively little expense.

From the above, with reference to the engravings, it can now be easily observed that these improvements will supply a long-felt want, especially in pianofortes. This is a very cheap and simple device. The ease with which it operates makes its introduction particularly desirable, as it will enable ladies to tune their own pianos at all times. For further information address the inventor, George L. Wild, No. 272 South Charles street, Baltimore, where pianofortes having these improvements attached can be seen. Patented Sept. 5, 1854.

### Gold Extracting and Chemistry.

There is an ore of arsenical pyrites at Reichenstein, in Silesia, which contains 200 grains of gold to the tun. For three centuries all attempts to work this ore, so as to extract the gold, failed—the precious metal being too minute in quantity to pay for the expense of extracting it. Recently, however, this has been accomplished, it is stated, by Prof. Plattner, of Freiberg, a distinguished chemist. By new processes and new re-agents he extracts the 200 grains of gold out of 15,686,000 grains of ore, at a profit. This is certainly one of the greatest triumphs of modern chemistry.

### Restoring Burnt Iron.

The acting-manager—Mr. Wm. Clay—of the Mersey Steel and Iron Works, at Liverpool, and the fabricator of the great wrought-iron 13 inch-gun, says that wrought-iron crystalized by exposure to heat or carelessly burnt, 'may have its fibers restored by working it under the hammer or in rolls." This is a valuable hint to workers in iron.

### New Alloy Resembling Silver.

An alloy composed of nickel, 4 parts, copper, 5, tin, zinc, lead, iron, and antimony, each one part, resembles silver in appearance, and possesses similar properties. These metals are placed in a crucible, and melted in a fire into a button, which can be afterwards rolled into sheets. A patent has been obtained for this alloy by George Toncas, of Paris, who has termed it "Toncas silver."

### The Expected Great Comet.

Several of our cotemporaries state that J. R. Hind, the celebrated English astronomer, having enlisted Prof. Littrow, of Vienna, to search for the astronomical charts of Fabricus and Joachim Heller—who had devoted much attention to the course of the great comet of 1556, which had a tail of 60 degrees—their efforts have been crowned with success, and from an examination of these charts Mr. Hind has come to the conclusion that the reappearance of this comet is near at hand.

### Iron Tramways for Common Roads.

B. H. Babbage recently read a paper before the Philosophical Society, in London, on the benefits that would result from placing iron tramways on common roads on which there was a great deal of travel. This is a feasible project,—one that would render such roads adapted for light steam carriages.